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PLANETARY PHENOMENA FOR SEPTEMBER AND  
OCTOBER, 1910.

BY MALCOLM McNEILL.

PHASES OF THE MOON, PACIFIC TIME.

|                  |  |                  |  |
|------------------|--|------------------|--|
| New Moon....     | Sept. 3, 10 <sup>h</sup> 6 <sup>m</sup> A.M. | New Moon ....    | Oct. 3, 12 <sup>h</sup> 32 <sup>m</sup> A.M. |
| First Quarter. " | 11, 12 11 P.M.                               | First Quarter .. | " 11, 5 40 A.M.                              |
| Full Moon....    | " 18, 8 52 P.M.                              | Full Moon ....   | " 18, 6 24 A.M.                              |
| Last Quarter..   | " 25, 12 54 P.M.                             | Last Quarter ..  | " 24, 9 48 P.M.                              |

The autumnal equinox, the time when the Sun crosses the equator from north to south, occurs September 23d, 2 P. M., Pacific time.

*Mercury* is an evening star on September 1st, but sets less than an hour after sunset, and cannot well be seen by the naked eye. It reached greatest east elongation on August 30th, but is too far south of the Sun for convenient observation in the northern hemisphere. It passes inferior conjunction with the Sun on September 25th and becomes a morning star. Shortly after October 1st it rises an hour before sunrise and the interval grows larger until about the middle of the month, when it is an hour and a half, and does not diminish much until toward the end of the month. *Mercury* passes greatest west elongation on October 11th, the distance from the Sun being  $18^{\circ}$ , a small greatest elongation, as it occurs only three days after perihelion passage, but the planet is north of the Sun and is in the part of its orbit farthest north of the ecliptic. The period of naked-eye visibility is therefore rather unusually prolonged.

*Venus* is still a morning star and remains so throughout the two months' period, but draws too close to the Sun for easy naked-eye visibility toward the close. On September 1st it rises a little less than two hours before sunrise, on October 1st a little more than one hour before, and on October 31st only about half an hour before, rather too short a time for naked-eye view. It passes its perihelion on September 16th, but its orbit is so nearly circular that this makes little difference in its brightness or position. It passes conjunction with *Mercury* at a distance of  $1^{\circ} 55'$  north on the morning of

October 3d, with *Mars* on the afternoon of October 22d at a distance of 45', and with *Jupiter* on the morning of October 28th at a distance of only 20'. Unfortunately the last two conjunctions are too near the Sun for easy visibility. On September 11th it passes less than 1° north of the first magnitude star *Regulus, Alpha Leonis*.

*Mars* is still an evening star on September 1st, but sets less than half an hour after sunset. The Sun with its more rapid easterly motion among the stars draws gradually nearer to it, and the two bodies come to conjunction on September 27th. *Mars* now becomes a morning star, and the distance between Sun and planet increases, so that by the end of October *Mars* rises about an hour before sunrise. It is, however, about at its faintest, and it will hardly be possible to see it with the naked eye until after November 1st. It reaches its greatest actual distance from the Earth on September 13th, 246,000,000 miles, and its brightness is then only a little more than two per cent of its brightness at the opposition of 1909.

*Jupiter* is also an evening star on September 1st, rather farther away from the Sun than was *Mars*, and is therefore in rather better position for observation. It sets about an hour and one half after sunset at that date, and can therefore be easily seen in the evening twilight. But the gap between Sun and planet closes up rapidly, and by October 1st the planet sets less than half an hour after the Sun, and the two bodies come into conjunction on the evening of October 18th. *Jupiter* then becomes a morning star, and by the end of the month rises nearly an hour before sunrise.

*Saturn* is about the only one of the planets in good position for evening observation. On September 1st it rises at about 9 P. M., and on October 31st a little before sunset. It is therefore above the horizon nearly the entire night, and comes to opposition with the Sun at 1 A. M., October 27th. It is in a rather barren part of the constellation *Aries*, and moves about 3° westward and 1° southward during the month. The rings are now opening, so that observations on them are easy compared with conditions for several years back. The minor axis is nearly one third the length of the major. This fraction is about one half when the opening is widest. The variation from mini-

mum to maximum takes about seven years, one quarter of the planet's period.

*Uranus* is also in good position in the sky for evening observation, but identification is not very easy. It remains above the horizon until 1:30 A. M. on September 1st and until 9:30 P. M. on October 31st. It is nearly stationary in the constellation *Sagittarius*, moving slowly westward through September and eastward in October, but the whole motion is only a fraction of a degree. No conspicuous star is near, but the third-magnitude star  $\pi$  *Sagittarii* is about  $8^\circ$  west and  $1^\circ$  north, also the fifth-magnitude  $h$  *Sagittarii* is about  $3^\circ$  nearly due south.

*Neptune* rises at about 1:30 A. M. on September 1st and at a little before 10 P. M. on October 31st. It is in *Gemini*.

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## PLANETARY PHENOMENA FOR NOVEMBER AND DECEMBER, 1910.

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BY MALCOLM McNEILL.

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### PHASES OF THE MOON, PACIFIC TIME.

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|--|--|
| New Moon ... Nov. 1, 5 <sup>h</sup> 56 <sup>m</sup> P.M. | New Moon ... Dec. 1, 1 <sup>h</sup> 11 <sup>m</sup> P.M. |
| First Quarter.. " 9, 9 29 P.M.                           | First Quarter.. " 9, 11 5 A.M.                           |
| Full Moon ... " 16, 4 25 P.M.                            | Full Moon ... " 16, 3 5 A.M.                             |
| Last Quarter.. " 23, 10 13 A.M.                          | Last Quarter.. " 23, 2 36 A.M.                           |
|  | New Moon ... " 31, 8 21 A.M.                             |

The third and fourth eclipses of the year occur in November.

A partial eclipse of the Sun November 1st. The region of visibility lies in the North Pacific Ocean, Northwestern Asia, and Alaska. The magnitude of greatest eclipse is about five-sixths of the Sun's diameter. The Sun will set during the eclipse in Alaska.

A total eclipse of the Moon November 16th. The entire eclipse can be seen in the eastern part of the United States, but only the latter part in the far west. The principal circumstances occur as follows, Pacific time:—

|                             |  |
|-----------------------------|--|
| Moon enters shadow .....    | Nov. 16, 2 <sup>h</sup> 44 <sup>m</sup> P.M. |
| Total eclipse begins .....  | " 16, 3 55 P.M.                              |
| Middle of the eclipse ..... | " 16, 4 21 P.M.                              |
| Total eclipse ends .....    | " 16, 4 47 P.M.                              |
| Moon leaves shadow .....    | " 16, 5 58 P.M.                              |